

Bellwork: 4/12/12

Find the multiplier

① 3% increase      ② 15% decay      ③ .1% growth  
1.03                      0.85                      1.001

Find the multiplier for each rate of exponential growth or decay.

1.) 2.4% growth 1.024

2.) 4% decay 0.96

3.) 1.4% growth 1.014

4.) 0.04% growth 1.0004

5.) 7.2% decay 0.928

6.) 0.7% decay 0.993

9) The population of a city in the year 2000 was 122,321,435. The population in 2000 was expected to decrease at a rate of 3.7% per decade. What is the expected population, rounded to the nearest thousand, in the year 2032?

$$122,321,435 (0.963)^{3.2}$$

$100\% - 3.7\% = .963$

$$\frac{2032}{-2000}$$

$$\frac{32 \text{ years}}{10 \text{ years}} = 3.2$$

$$108,419,321$$

$$108,419,000 \text{ people}$$

10) The population of Rochester is 17,000 and is projected to grow at a rate of 4.5% per decade.

- a) Write an expression for the projected population of Rochester after n decades.  $17,000(1.045)^n$

- b) Predict the population, to the nearest hundred, of Rochester after 40 years.

$$17,000(1.045)^4 =$$

~~20,272 people~~

20,300 people

7.) A physician gives a patient 250 milligrams of an antibiotic that is eliminated from the bloodstream at a rate of 15% per hour. Predict the number of milligrams remaining after 3 hours.

$$250(0.85)^3 = 153.53 \text{ mg}$$

$$\begin{array}{r} 100\% - 15\% \\ 0.85 \end{array}$$

**Example 1:** Tell whether each function represents exponential growth or decay. Then give the y-intercept.

a.)  $k(x) = 500(\underline{1.5})^x$

$1.5 > 1$   
growth

c.)  $s(k) = 60(\underline{0.5})^k$

$.5 < 1$   
decay

b.)  $d(x) = 0.125\left(\underline{\frac{1}{2}}\right)^x$

$\frac{1}{2} < 1$   
decay

d.)  $f(k) = \frac{1}{4}(\underline{2})^k$

$2 > 1$   
growth

Compound Interest:

$$A(t) = P \left( 1 + \frac{r}{n} \right)^{nt}$$

annually, monthly

$n=1$

$n=12$

daily

$n=365$

A(t): Final Amount

P: Amount Invested Initial Amount

r: rate (%)

n: Number of times compounded per year

t: years

**Example 2:** Find the final amount of a \$100 investment after 10 years at 5% interest compounded annually, quarterly, and daily.

a.) annually      P = 100   r = .05   n = 1   t = 10

$$A(t) = 100 \left( 1 + \frac{.05}{1} \right)^{1 \cdot 10} = 100(1.05)^{10} = \$162.89$$

b.) quarterly      P = 100   r = .05   n = 4   t = 10

$$100 \left( 1 + \frac{.05}{4} \right)^{4 \cdot 10} = \$164.36$$

c.) daily      P = 100   r = .05   n = 365   t = 10

$$100 \left( 1 + \frac{.05}{365} \right)^{365 \cdot 10} = \$164.86$$

Homework: 4/12/12

6.2 notes - try this